of acrocentrics) is most probably due to a simple Robertsonian fusion or fission. Unfortunately, the poor quality of G-banding in both GEORGE's (1979) and our studies does not allow any detailed comparison and homologization of individual chromosomes. Although Robertsonian fusions are supposed to be more frequent than fissions in mammals (suggesting thus that the Zambian population would be more ancestral) (cf. also NEVO et al. 1986), the opposite process ot fission cannot be excluded (cf. NEVO 1999).

In view of the remarkable chromosome diversification of *Cryptomys* in the Zambezian region (i. e., in Zimbabwe, Zambia, and Malawi), yet its uniformity in the Southern African subregion (SCHARFF 1998; BURDA 2001), the relative constancy of the karyotype of *Heliophobius* is of particular interest. It can be assumed that, contrary to mole-rats in most of the Zambezian region, the populations of silvery mole-rats east of the Great Rift Valley have never been fragmented so that also isolation and speciation could not occur.

Regarding the paucity of data on silvery mole-rats, it is worth to mention observations which we made on the Zambian silvery mole-rats. Altogether eleven mole-rats (1 male and 6 female adults, 1 female and 3 male juveniles) were obtained in the Lubalashi Area, south of the Lunsemfa River in the Luano Valley, in miombo-woodland, mixed with few agricultural spots. The ground of the thin miombo forest was densely covered with tall grass which was partly burned by farmers. The adult male weighed 200 g, the average weight of the adult females was 146 ± 20 g (range 118–170 g; $n = 6$). Four females reared a single pup each. The male pups weighed 26 g, 34 g, and 48 g, whereas the weight of the single female pup was 37 g. At the time of capture (August 1996), the pups were haired and their eyes and ears were open. The high proportion of nursing females in the sample suggests a distinct breeding season, with (small) litters being delivered during the dry season (which lasts from April/May till October/November).

Burrow systems (identified by the presence of mounds) of silvery mole-rats were very unevenly distributed in the study area. The mounds measured about 30 cm (up to 50 cm) in diameter. Burrow systems consisted of a main straight tunnel with short side branches and reached about 50 m in length. Most parts of the main tunnels were only 10–20 cm deep but some parts went into depth of more than 150 cm. A few blind ending tunnels or "bolt holes" were found. Diameter of burrows was 8–9 cm on average. One breeding nest was hidden within the system of tree roots, 20–30 cm deep. *Heliophobius* has been observed in two occasions feeding on (undetermined) grass rhizomes. The grass also served as nesting material.

No macroscopic ectoparasites nor intestinal helminths have been found in any of the animals.

Although silvery mole-rats have been reported to be highly aggressive (JARVIS and SALE 1971; JARVIS 1973), our silvery mole-rats could be kept in pairs and have not engaged in serious fighting. Also, presence of juveniles was tolerated. One male offspring lived with its mother in a common cage for more than one year (three other juveniles died within three months of the capture). Furthermore, most of the adult silvery mole-rats were tame immediately after capture and did not try to bite.

References

BURDA, H. (2001): Determinants of the distribution and radiation of African mole-rats (Bathyergidae, Rodentia): Ecology or geography? In: Collection Colloques et seminaires. Paris: Editions IRD (in press).

FORD, C. E.; HAMERTON, J. L. (1956): A colchicine, hypotonic citrate, squash sequence for mammalian chromosomes. Stain Technol. **31**, 247–251.

GEORGE, W. (1979): Conservatism in the karyotypes of two African mole-rats (Rodentia, Bathyergidae). Z. Säugetierkunde **44**, 278–285.

HSU, T. C.; BENIRSCHKE, K. (1967): An Atlas of Mammalian Chromosomes. Berlin, Heidelberg, New York: Springer-Verlag.

Jarvis, J. U. M. (1973): Activity patterns in the mole-rats *Tachyoryctes splendens* and *Heliophobius argenteocinerus*. Zool. Afr. **8**, 101–119.

Jarvis, J. U. M.; Sale, J. B. (1971): Burrowing and burrow patterns of East African mole-rats *Tachyoryctes*, *Heliophobius* and *Heterocephalus* J. Zool. (London) **163**, 451–479.

McNab, B. K. (1966): The metabolism of fossorial rodents: a study of convergence. Ecology **47**, 712–733.

Nevo, E. (1999): Mosaic Evolution of Subterranean Mammals: Regression, Progression, and Global Convergence. Oxford: Oxford University Press.

Nevo, E.; Capanna, E.; Corti, M.; Jarvis, J. U. M.; Hickman, G. C. (1986): Karyotype differentiation in the endemic subterranean mole-rats of South Africa (Rodentia, Bathyergidae). Z. Säugetierkunde **51**, 36–49.

Scharff, A. (1998): Verhaltensökologie und Systematik sambischer Sandgräber (Bathyergidae, Rodentia). Diss. thesis, University of Essen.

Seabright, M. (1971): A rapid banding technique for human chromosomes. Lancet **2**, 971–972.

Sumner, A. T. (1972): A simple technique for demonstrating centromeric heterochromatin. Exp. Cell Res. **75**, 304–306.

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Short communication

New distributional records of small mammals at Beni Biosphere Reserve, Bolivia

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The mammalian fauna of Bolivia is among the least known in South America (Pine 1982). Fortunately, the knowledge about the diversity and distribution of this fauna has been increasing in recent years (e. g., Anderson 1997; Eisenberg and Redford 1999). Currently, 316 species are recognized for Bolivia, 71% of which are small mammals. The geographic distribution of most species is based on a handful of records from a few sites (Anderson 1997). Consequently, new distributional records are needed to clarify further the biogeography of Bolivian mammals (e. g., Yensen et al. 1994; Tarifa and Anderson 1997).

Much sampling effort has been devoted to the northern highlands and La Paz valley (Ergueta and Sarmiento 1992). In the Amazonian region, the Beni Biosphere Reserve (EBB) has received considerable attention in recent years (Herrera-MacBryde et al. 2000), including sampling of bats, marsupials, and rodents (Cabbot et al. 1986; Wilson and Salazar 1989; Anderson 1997; Yáñez et al. 1998; Brace et al. 2000; see also Rumiz and Herrera 2000). The reserve lies in the Llanos de Moxos region, a center of high plant biodiversity. Furthermore, it is regarded as a key area for the conservation of threatened birds in the Neotropics (Brace et al. 2000; Moraes et al. 2000). Currently, only 11 species of small mammals have been registered, seven rodent and four marsupials (Cabot et al. 1986; Anderson 1997). However, despite the efforts allocated to inventorying mammals at the EBB, ongoing sampling of mammals at both a terra firme forest and forest fragments at El Porvenir ranch, EBB'headquarters, have revealed four new species for the region. Here we present these noteworthy records.

During 1996 a small live-trapping sampling bout was allocated to three forest fragments at El Porvenir (Yáñez al. 1998). Two others have been sampled since 1999. Forest fragments sampled during 1999 and 2000 are known as "Taita B" (2.2 ha) and "Airstrip B" (0.3 ha) (14°51′37″ S/66°19′68″ W 163; Brace et al. 2000). We also sampled the grassland neighboring a water course and marsh close to the forest fragment named "Porv A". The sampling site at the terra firme forest, known as "Campo Monos" is located roughly 45 km NW from El Porvenir (14°39′59″ S/66°04′60″ W and 130 m asl, see Moraes et al. 2000 for vegetation description). During 1999–2000, sampling consisted of live-trapping and collecting for four consecutive nights each time with 200 medium Sherman traps in linear transects, traps being 10 m apart. We have also examined prey remains

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in 440 pellets of the barn owl (*Tyto alba*) collected at El Porvenir (Vargas et al. unpubl.). All specimens collected have been deposited in the Coleccion Boliviana de Fauna (CBF), La Paz.

Marsupialia: Didelphidae

Marmosops dorothea (Thomas, 1912) is endemic to Bolivia and regarded as threatened by the IUCN (Nowak 1999) This marsupial has a disjunct distribution with records in the humid Yungas of La Paz (840–2 300 m asl) as well as in the arid lowlands of Santa Cruz (250–620 m asl; Anderson and Tarifa 1996). Known from 23 localities and 46 specimens, the two areas of distribution are over 400 km apart (Anderson 1997). This broad disjunction led Anderson and Tarifa (1996) to suggest that two taxa could be involved. However, we collected it at Campo Monos, a record in the middle of the distribution gap challenging this contention.

A single subadult female (CBF 6442; TL 208, T 122, HF 15, E 18; 15 g) was captured (July 1999) in a seasonally flooded forest, close to the Curiraba river, the understory dominated by *Heliconia* sp, coinciding with known habitats of *M. dorothea* (Emmons 1999). The single specimen represents 2% of small mammals captured in a total of 424 trap/nights. Besides *M. dorothea*, *Oecomys bicolor*, *Oryzomys capito*, *Philander opossum* and *Proechimys* sp. were also captured in the same habitat.

Rodentia: Muridae

Microryzomys minutus (Tomes, 1860): the pigmy rice rat is known from high elevations (2500–3000 m asl) in the Andes of Ecuador, Peru and Bolivia (Eisenberg and Redford 1999). It has also been reported for the Monte Zerpa's cloud forest in Venezuela (Diaz 1994). In Bolivia, it is known from 10 localities and 28 specimens of the Yungas from Cochabamba, La Paz and Santa Cruz (Anderson 1997). Despite being considered a highland species (e. g., Nowak 1999), a subadult female (CBF 7078; TL 163 mm, T 90, E 14, HF 21, 12 g) was collected at Campo Monos in September 2000. It was captured in a forest tract with an understory dominated by *Heliconia* sp. In this habitat, *Marmosops dorothea*, *Oecomys bicolor*, *Oryzomys capito*, *Philander opossum* and *Proechimys* spec. were also captured. *Microryzomys minutus* represents 2% of the 52 individuals captured at Campo Monos, with a trapping success of 0.2% (one out of 424 trap/nights), suggesting it might be rare.

There were no records of *M. minutus* at the Department of Beni. This record extends its known distribution roughly 150 km NW of its previously recorded limits. Besides it biogeographical relevance, the record of *M. minutus* is of medical concern for EBB human populations, as this species might be a reservoir of human cutaneous leishmaniasis (Alexander et al. 1998).

Oxymycterus spec. (Waterhouse, 1837): burrowing mice inhabit open grassland, marshes, swamps, and grasslands being rare in humid forests (Emmons 1999). Three species including five subspecies are known from Bolivia, but their biology is unknown (Anderson, 1997). Of these species, *Oxymycterus inca iris* (Thomas, 1901), dwells in the humid forest of the Amazonian lowlands. In Bolivia it is known from 20 localities and 63 specimens from La Paz, Santa Cruz and the western portion of Beni. We recorded it as prey of *T. alba* at El Porvenir, extending its distribution 100 km NE. The single skull recovered represents 0.2% of the prey remains of *T. alba* over 1998–1999 (Vargas et al. unpubl.).

Bolomys spec. (Thomas, 1916): a single skull of *Bolomys* spec. was found among the prey of *T. alba* (Vargas et al. unpubl.). While the individual undoubtedly belongs to *Bolomys*, it was not possible to assign it to any of the three species known for Bolivia. *Bolomys amoenus* (Thomas, 1900) is known from four localities and just 13 specimens, being restricted to Cochabamba and Tarija at elevations from 3 800 to 4 000 m asl (Anderson 1997). However, Anderson (1997) includes the southeastern portion of Beni in its distribution with no further support. If our specimen represents *B. amoenus*, this record will increase its distribution 260 km NW denot-